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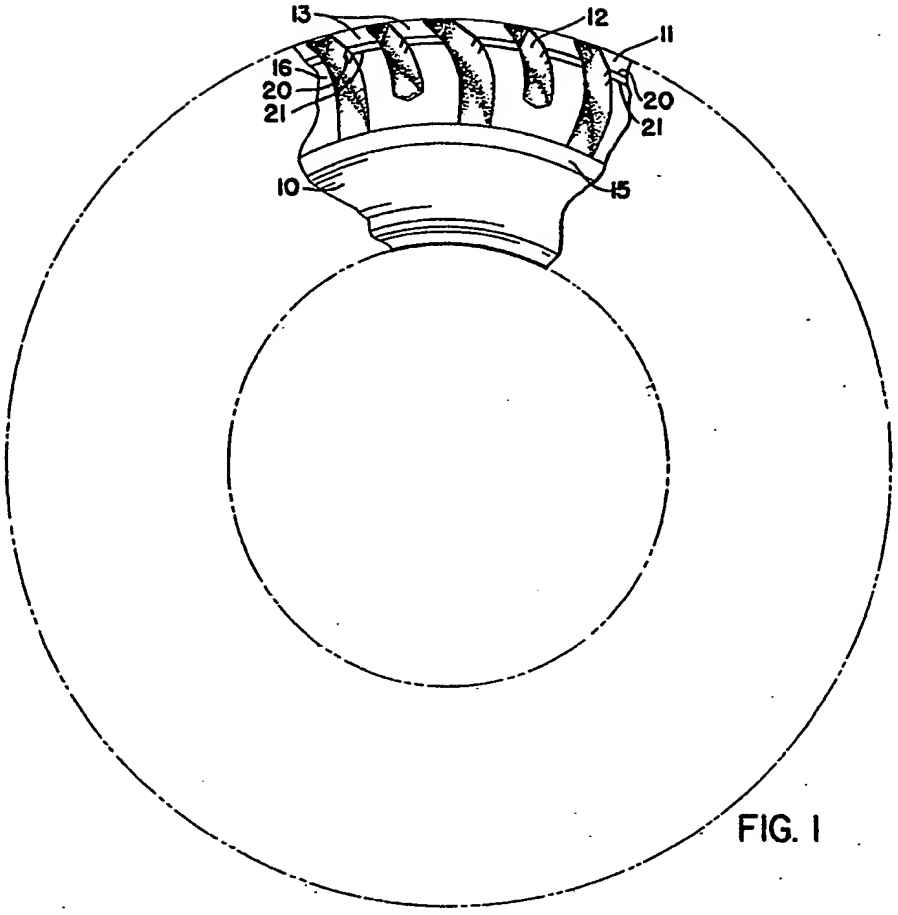


FIG. 1

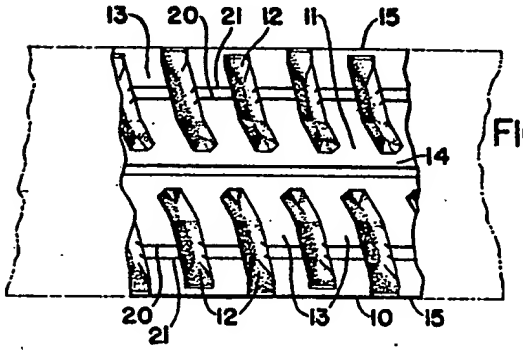


FIG. 2

691,587 COMPLETE SPECIFICATION
2 SHEETS
This drawing is a reproduction of the Original on a reduced scale.
SHEETS 1 & 2

FIG. 1

FIG. 3

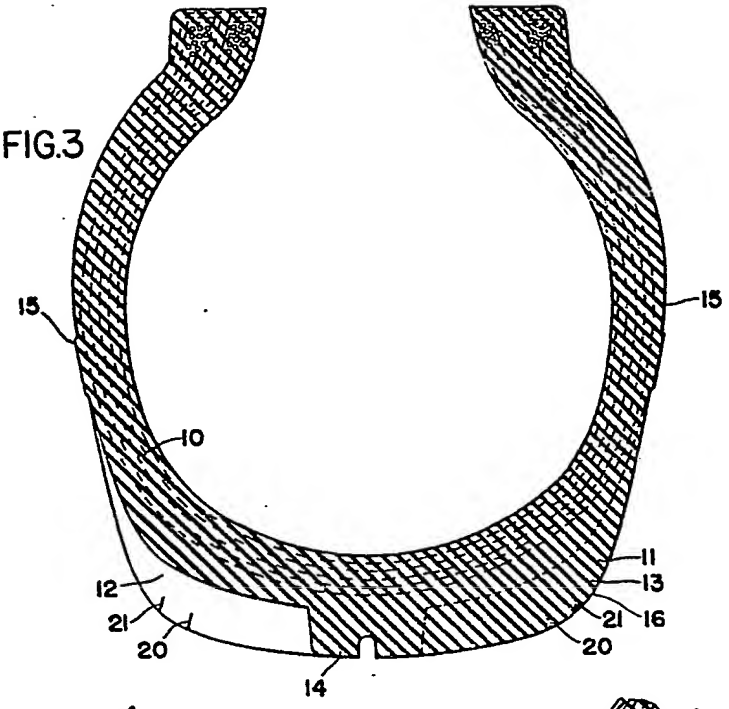


FIG. 4

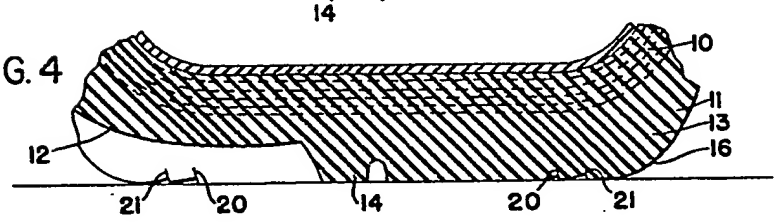
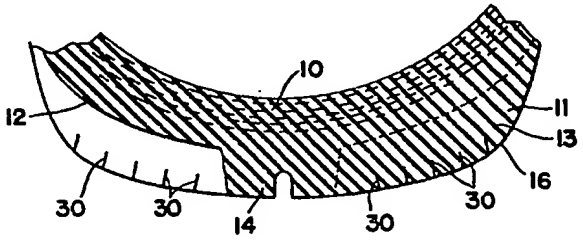


FIG. 5



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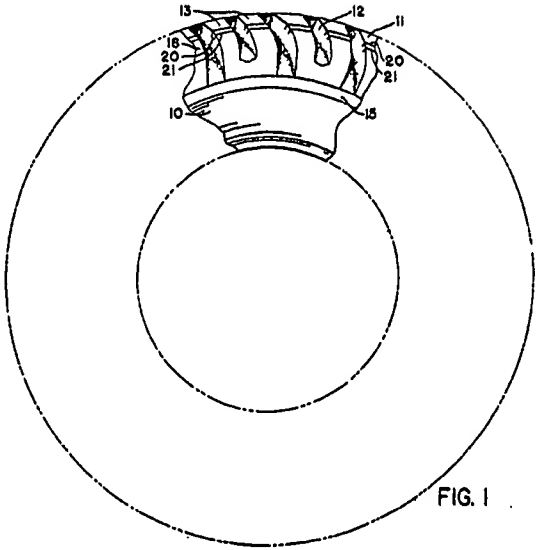


FIG. 1

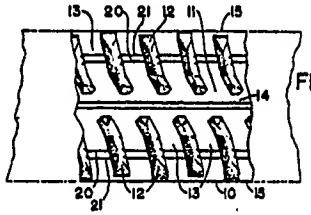


FIG. 2

FIG.3

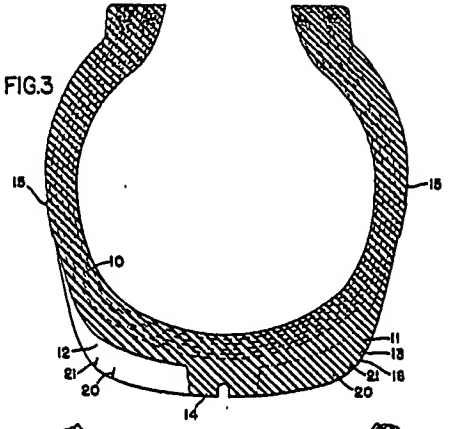


FIG. 4

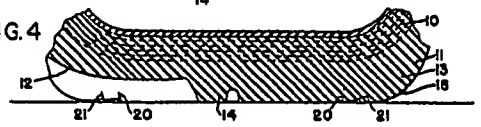
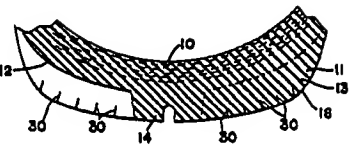


FIG. 5



PATENT SPECIFICATION

Inventor: EVERETT HAYWARD GIBBS

691,587

Date of Application and filing Complete Specification Dec. 31, 1951.

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Complete Specification Published May 13, 1953.

Index at acceptance :—Class 144(ii), C3d3.

COMPLETE SPECIFICATION

Pneumatic Tyre

We, SEIBERLING RUBBER COMPANY, a Corporation of the State of Delaware, United States of America, doing business at 345,—15th Street, Barberton, Ohio, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to heavy duty pneumatic tyres having traction lugs.

Heretofore, heavy duty tyres as for large trucks or other vehicles, have been provided with rubber treads having central circumferential rib portions and heavy lugs extending therefrom. An objectionable feature of previous lug type tyres, however, has been that while in highway service such tyres had satisfactory forward traction and non-skid ability, resistance to sidewise skidding on slippery surfaces was not satisfactory. Provision of deep circumferential grooves near the center of the tread to overcome such sidewise skidding would result in cracking at the bases of the grooves, due to concentrated flexing and stretching of the rubber at the bases of the grooves. The stretching of the rubber is caused by growth of the tyre.

It is an object of the present invention to provide a traction lug type tyre having highly satisfactory characteristics with respect to forward traction and including improved means for preventing or minimizing sidewise skidding of the tyre.

Another object of the invention is to provide a lug type tyre of the character described which will provide long mileage in service without failure due to excessive heat generation.

Other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:—

Figure 1 is a side elevation, partly broken away and partly shown in chain-dotted lines, illustrating a heavy duty truck tyre embodying the features of the invention.

Figure 2 is a fragmentary edge view of said tyre.

Figure 3 is a transverse cross-section through the tyre in normal vulcanized condition.

Figure 4 is a fragmentary cross-section of the tread portion of the tyre under road conditions in which it is tending to skid to the left.

Figure 5 is a fragmentary cross-section, corresponding to the tread portion of Figure 3, illustrating a modified form of the invention.

Referring particularly to Figures 1 to 4 of the drawings, there is illustrated a heavy duty truck tyre including the usual fabric-reinforced carcass 10 and a rubber tread portion 11. The tread is provided with non-skid configurations including opposite series of circumferentially spaced grooves 12, 12 of substantial depth, defining corresponding circumferentially spaced traction lugs or bars 13, 13, extending laterally substantially in parallelism from each side of and integral with a central circumferentially continuous rib portion 14. The lugs are substantial and solid in character and therefore substantially resistant to flexing action under normal load stresses in use of the tyres. Each traction lug 13 extends approximately a third of its length from rib portion 14 at an acute angle to the general plane thereof and for the remainder of its length at an obtuse angle to the shorter portion, and these angular portions of the lugs of one said series thereof are substantially parallel to the corresponding angular portions of the other series of lugs. The crown or outer ground-engaging surface portion of the tread is of known laterally arcuate shape, generally at a substantial radius from a point

on the center line of the tyre section. The wearing quality of the tyre is substantially improved by rounding the axially outer edge portions of the lugs 13 at a substantial radius from the ground-engaging surface of the lug to an outer face of the lug blending into the usual rubber side wall portion 15 of the tyre. This radius is at least equal in measurement to the depth of the grooves 12.

A tyre having a lug-type tread design as described will have satisfactory characteristics with respect to traction in forward rolling movement of the tyre in normal use of the same on a highway, for example. That is, the heavy or solid lugs present a multiplicity of edges which are ample for forward traction, and the well rounded outer edge portions on the lugs minimize stresses on lateral flexing of the tread portion which would be likely to generate damaging heat in the tread rubber.

A solid traction lug type of tyre as described, however, does not provide resistance to sidewise skidding in service on a smooth highway, such as would be possible with the more flexible non-skid projections of known types of smaller tyres, for example. Accordingly, as best shown in Figure 3, the present invention contemplates provision of a circumferential slit or pairs of circumferential spaced parallel slits or cuts 20 and 21 on each lug adjacent the outer edge portions thereof. Highly satisfactory results have been attained by positioning the outer slits 21 closely adjacent the points of juncture of the rounded ends 16 of the lugs 13, 13 and the crown of the tread, so that the inner slits 20 will fall within the width of contact of the tread with the road when the new tyre is under normal load. As an example, the inner circumferential slits 20, 20 may be positioned outwardly of the tread center line 33⅓ to 80% of the distance from the tread center line to the outer shoulder of the lugs, and the outer slits 21, 21 may be spaced from the slits 20, 20 10% to 20% of the distance from the tread center line to said outer shoulder of the lugs. For preventing excessive movement of the tread rubber during normal forward rolling of the tyre, the slits 20 and 21 should be relatively narrow so that the block of rubber between the spaced slits 20 and 21 is supported against the adjacent tread rubber when the tyre is under load. The widths of the slits (or slots) 20 and 21, for example, may be from zero to 1% of the total width of the tread, and they may extend inwardly to a depth of from one-third to two-thirds of the depth of the grooves 12, 12 between the lugs. The inner slits 20, 20 may be substantially in planes or radials from the radius point of the arcuate crown, and as previously stated, with the outer slits 21, 21 parallel theret .

In use of the improved tyre, illustrated in Figures 1 to 4, under loaded condition thereof on a highway, should the tyre tend to skid to one side or the other, such skidding will be prevented or minimized by flexing of the corner portions of the tread adjacent the slits 20, 21 in the opposite direction. Figure 4 shows the condition in which sidewise skidding tends toward the left. Thus, on each lug in lateral sliding contact with the road surface two edge portions or corners will be presented against said surface to stop the sliding movement. In normal forward rolling movement of the tyre, without lateral swaying motion these flexible edge portions do not materially minimize the previously described firm forward tractional qualities of the lugs.

In the modification of the invention shown in Figure 5, the tread is substantially as shown in Figure 3, except that a plurality of spaced parallel circumferential slits or slots 30, 30 are provided along the full lengths of the traction lugs, the two outermost slits on each lug being arranged the same as slits 20 and 21 in Figure 3. The spacing and depth proportions of the slits are otherwise as before, but in any event, the purpose of the slits or slots is to minimize lateral skidding in service without substantially reducing the desirable forward traction qualities of the type of tread design illustrated.

Modifications of the invention may be resorted to without departing from the scope of the appended claims.

What we claim is:—

1. A pneumatic tyre having a rubber tread portion provided with anti-skid configurations including a central circumferential portion and circumferentially spaced traction lugs integral therewith and extending laterally therefrom to adjacent the opposite side edges of said tread portion, said lugs being generally substantial and solid and therefore substantially resistant to flexing action under normal load stresses in use of the tyre, said laterally extending lugs having at least one slit extending circumferentially across the lugs and radially inwardly of the tread surface to a substantial depth without materially reducing the substantial forward traction qualities of the tyre whilst minimizing lateral skidding of the same.

2. A tyre as claimed in Claim 1, wherein said lugs are provided with a pair

of laterally spaced slits, said slits forming blocks which are laterally flexible in said use of the tyre to minimize lateral skidding of the same.

3. A tyre as claimed in Claim 2, wherein said slits are provided adjacent the side edges of the tread portion.

4. A tyre as claimed in Claim 2 or 3, wherein said lugs are rounded at the axially outer edges thereof on a substantial radius.

5. A tyre as claimed in Claim 4, wherein said radius is equal to at least the depth of the spaces between the lugs, the axially outermost slit of each lug being adjacent the juncture of the radius and the crown of the tyre tread.

6. A tyre as claimed in any of Claims 2 to 5 wherein said spaced slits are substantially parallel.

7. A tyre substantially as described with reference to Figures 1 to 4 and Figure 5 of the accompanying drawings.

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